DESKTOP TOTAL COST OF OWNERSHIP FOR THE BUDGET AND CONTROL BOARD'S OFFICE OF INFORMATION RESOURCES

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Project Goal and Problem Statement: The Office of Information Resources' Local Area Network Technical Services unit provides personal computer and local area network support for several offices of the Budget and Control Board, the Governor's Office, the Lt. Governor's Office, the State Treasurer's Office, the Ethics Commission, the Second Injury Fund, and the State Human Affairs Commission. This support includes providing the local area network infrastructure, as well as the daily operation, maintenance and support of all desktop workstations. There are approximately 725 workstations currently being supported by the LAN infrastructure.

When the LAN support unit was formed, it did not charge directly for its services; however, with each passing year, appropriated funds to support this unit have dwindled to zero. Last fiscal year, this unit was asked to become self-supporting. All services provided would be billable to the responsible agency. A rate structure was devised and agencies were apprised of the charges. Since the charge-back system has been implemented, agencies question bills received and want to ensure they are getting a quality service at a reasonable, fair price. OIR upper management also wants to understand the costs associated with installing and supporting the desktop components throughout their life cycle (the desktop "total cost of ownership").

The goal is to identify what the desktop "total cost of ownership" is today, to identify better methods for managing and maintaining the desktop, and to ensure chargeback rates are as low as possible. Today's total cost of ownership will be evaluated and recommendations for implementing "best practices" (both management processes and automated tools) will be completed by the end of the 1999 calendar year. Data available includes accounting information regarding desktop procurements, existing spreadsheets

of technician hourly billing to support desktops, email systems, research and deployment, and network infrastructure systems. It is anticipated that "best practices" implementations will take several years as tools are generally implemented in a phased approach, require a lengthy planning, testing and implementation process; and management process changes may require approvals and a change in the way employees work. The rate structure will be re-evaluated and the impact of the "best practices" implementation will be evaluated in May of 2000 and 2001.

Analyst Joe Pucciarelli, Gartner Group, said that "in a well–run data center (mainframe environment), purchase price accounts for about 70% of the total cost of ownership; 30% goes for support. But in PC environments, the numbers are turned around. Nearly 80% of the total cost of ownership comes from support."

There is a high rate of change in the local area network environment that impacts the management of the overall IS budget. Performance and end-user demands are increasing; however, the LAN support group is being pressured to reduce LAN costs. OIR LAN customers continue to question the validity of their charges. They would like to understand that they are being charged a fair rate for good, quality service? Customers also see more than one technician working on a single problem. Is this necessary?

Data Collection and Analysis: Several models for calculating total cost of ownership were reviewed. The model the Gartner Group developed was chosen, as it appears to be the model used industry-wide. Numerous sources referred to and/or quoted results of the Gartner Group model. The Gartner Group has modified its model several times over the last ten years. The most current model includes the following "chart of accounts:"

1. Hardware and software (capital and lease expenses)

   This category includes the "annual capital expenditures associated with client computers (both desktops and mobile), servers, peripherals, and networks. Included in the hardware and software costs are the acquisition capital costs, disposal fees (if any), and residual values for the client/server computers, network hardware, software applications, software utilities, and operating system software. As well, this category includes lease fees for both hardware and software."

"It should be noted that the hardware and software for the IS data center, help desk and other IS personnel are included in this category, typically under utility hardware and software. Expenses for backup systems, network and systems management software, and the help desk's computers and software is allocated in this model category as well."

2. Management (network, systems, and storage management labor and fees)

"Management is the direct IS labor expenses and outsourcing fees for managing the network, desktop and mobile computers, servers, applications, and storage infrastructure."

3. Support (help desk, training, travel, and overhead)

"Support costs are the direct labor expenses and fees associated with supporting the network's users. Labor and fees are divided into two categories, help desk support (Tier 1 support only) and operations, the overhead tasks necessary to deliver IS services to the organization. Operations labor and fees includes maintenance and support contracts (Tier 1 only), IS and end user training, IS travel, procurement, vendor management, and IS executive/middle management overhead labor. Help desk support is comprised of help desk staffing expenses, and key help desk metrics."

4. Development (labor and fees)

"Development costs are the annual IS labor expenses and fees for the design, development, test, documentation, configuration management and maintenance of all applications. Applications considered in the Development section can be divided into two categories:

- Infrastructure Applications—those programs that provide the base functions for productivity and business, but do not dorectly provide business services. Infrastructure applications include systems management programming, customization of GroupWare and communications software, database software setup, and programming of office productivity suite software.

- Business Applications—those programs that generate, track or manage business revenue and are considered mission critical, including programs for sales automation, order processing, financial and accounting, payroll, inventory management, human resource management, and other horizontal and vertical business applications."

5. Communication fees

"The communications fees are the annual expenses paid for the lease lines, remote access services, WEB hosting/ISP fees, and WAN costs allocated to the client/server network."

For the OIR model, the first three items were selected for use, as they are directly relevant to LAN Technical Services. Item 4, Development costs, includes annual labor expenses and fees for the design, development, testing, documentation, configuration management and maintenance of all applications. OIR LAN Technical Services does not provide this service; therefore, it was not included. The applications (GroupWare and Office suite) are not customized. Item 5, Communications Fees, includes annual expenses paid for lease lines, remote access servces, WEB hosting/ISP fees, and WAN costs allocated to the client/server network. This category was not used as these costs entail services used not only by the local area network, but also the mainframe and network support staffs. These costs have not been allocated to separate functions within the organization.

The Total Cost of Ownership calculations (see Attachment A) for OIR follow:

HARDWARE AND SOFTWARE (CAPITAL)

Hardware	$414,970.49
Software	$ 78,999.02
Miscellaneous	$ 54,770.80
Capital Total	$548,740.31

MANAGEMENT (TECHNICAL SUPPORT)

Labor	$613,990.00
Maintenance	$ 18,000.00
Technical Support Total	$631,990.00

SUPPORT (ADMINISTRATION)	
Training and Travel	$ 16,483.00
Help Desk	$ 44,450.00
End User Training	$ 5,215.00
Purchasing/Admin	$ 61,399.00
Administration Total	$127,547.00
Grand Total	**$1,308,277.31**

The above data indicates that capital expenditure (at 42% of the total) and technical support costs at (48% of the total) involve the major expenditures for the organization. (See Attachment B.) These two categories offer the greatest opportunity for identifying cost saving techniques.

The capital expenditures for this period of time included a major expenditure for workstations; a total of 180 PC's were procured to replace old, outdated PC's within OIR. (See Attachment C.) This coincided with an upgrade of all workstation software to Windows 95, GroupWise 5, and Office 97. Many of the older PC's had to be replaced as they did not have the capacity to run Windows 95, GroupWise 5, and Office 97.

An analysis of the OIR "per workstation" TCO (see Attachment D) reflects the following:

Expenditures Per Workstation (277 PC's in OIR)	
Capital	$1,981.01
Technical Support	$2,281.55
Administration	$ 460.46
Total Per Workstation	**$4,723.02**

The Gartner Group's "per workstation" TCO is as follows:

Capital	$2,962.00
Technical Support	$1,758.00
Administration	$1,269.00
Total Per Workstation	$5,989.00

While the Gartner Group's per workstation TCO is higher overall than OIR's, there appears to be room for improvement in the technical support category.

Implementation Plan:

Now that OIR's per workstation Total Cost of Ownership has been established, methods for improving management and maintenance of these workstations can be evaluated and possibly implemented. Best practices that were identified that may improve OIR's services and possibly lower costs include the following:

1. **Define and enforce hardware, software, and configuration standards.**

   The fewer the number of technological differences throughout the network, the easier and more cost effective it should be to provide support.

   - Standardize specific system models and operating system platforms for servers, workstations, and peripherals; and define a standard set of software applications for specific user types
   - Standardize the vendors that the organization procures from, permitting gains in purchasing leverage, reducing compatibility issues, support issues, vendor liaison requirements, testing of new technology, and administrative costs of vendor management.
   - Standardize the workstation configuration so that all technicians are trained on consistent installation and troubleshooting.

2. **Implement desktop management technologies.**

   Reduce the number of trips to the desktop, and you reduce your support costs.

   - **Automate the Asset Management (hardware and software inventory) function**, to include electronically-supported procurement, automated inventory (both hardware and software), and a centralized database available to key IS employees throughout the organization. The centralized database should include asset management information to include hardware inventory, software inventory, procurement information, contract terms, maintenance records, change history, support history, etc.
   - **Automate Software Distribution** which provides technical staff the ability to install software on a client workstation without having to physically visit each device.

- **Automate Virus Detection and Repair**using a software system that actively monitors and detects virus intrusions, alerts technicians and users to such events, and provides automated eradication and damage repair to the extent possible. This software should protect both client and server systems. Automatic updates of the software must be received frequently.
- **Implement Unattended Power Up** so thata workstation can be powered up remotely on the network. This enables technicians and/or server systems to perform tasks whether a workstation is powered on or off.
- **Install Client Remote Control** software in order for a technician to be able to operate a user's workstation from another PC over the network. This enables the technician to take command of the user's workstation, or monitor the user's activities on that workstation. This function allows remote troubleshooting, training, and support, and eliminates travel to the client location. This is especially beneficial to OIR since it services customers throughout the greater Columbia area and Charleston.

3. **Minimize users' ability to get themselves in trouble.**
   - **Review methods for "User State Management and Restore**." This function permits the workstation systems to be mirrored on the server. In the event of a system crash or an unauthorized user change, this process enables the server to restore the workstation automatically to its last saved state.
   - **Lock the User Environment** to preclude the user from changing settings and installing unauthorized software. This is different from a managed user environment in that it is machine specific and is local to a specific device. It is not managed or synchronized with a server profile.
4. **People Improvement and Involvement**

   Knowledge is good. The more the users know, the more staff knows the better.

- **User Training**, according to statistics, impacts the bottom line as an under-trained user consumes two to six times the amount of technical support than an adequately trained user.
- **IS Training** prepares the IS staff to deliver superior support and services to users, to implement technology initiatives and solutions, and to resolve user problems quickly and effectively.
- A **Highly Motivated IS Staff** is one that will operate as a team and will pitch in when needed to solve the challenge at hand. They often exceed expectations and provide critical backup for each other. They work harder to meet the goals set by the organization.
- A **Stable IS Organization** is critical to ensuring team members are consistent and focused. It provides for a mature staff, and permits more mature processes and procedures.

5. **Keep the infrastructure reliable.**
   - **Investigate Systems Management** methods for an automated event management system that proactively notifies system technicians of failures, capacity problems, traffic issues, virus attacks, etc. The software monitors system status, performance indicators, thresholds, user notifications, and trouble ticket dispatch.
   - **Improve coordination between Support Layers** the router group, the firewall group, the mainframe group, etc.
   - **Capacity Planning** is a process by which the capacity of the network and assets is measured, compared against requirements and adjusted as appropriate.

A project plan that outlines tasks to be accomplished along with their due dates is attached (Attachment E).

Resources identified to complete the tasks identified in Attachment E include staff already dedicated to the LAN infrastructure, to the R&D function, or are members of the LAN management team. Some of the products identified during the course of this project will require funds. These funds (assuming the costs are within certain parameters) have been set aside for the LAN infrastructure.

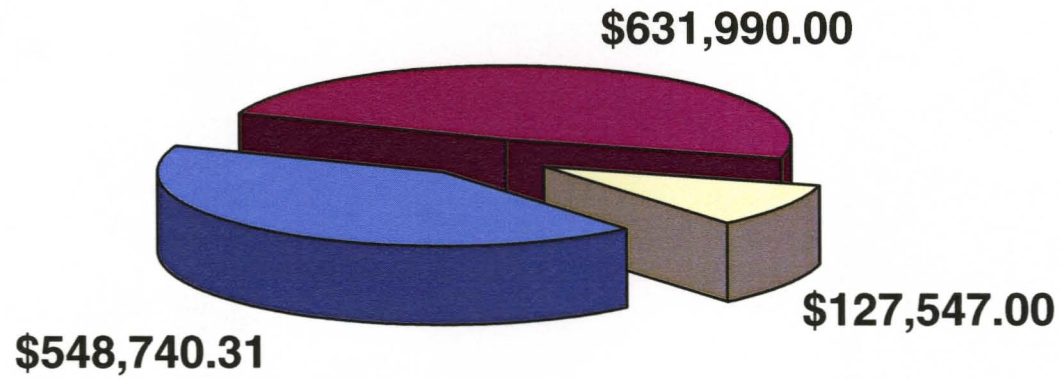
In addition to ensuring adequate funds and time are available for the project, other anticipated obstacles include ensuring buy-in by all technicians of the new tools, standard and procedures. This can be accomplished by ensuring that technicians understand the purpose of the tools, know how to use the tools, and understand management's purpose for implementing the new tools. Currently, there is no known negative impact to the user. Of course, users would be informed of changes to the network and/or their workstation in the event of unanticipated problems.

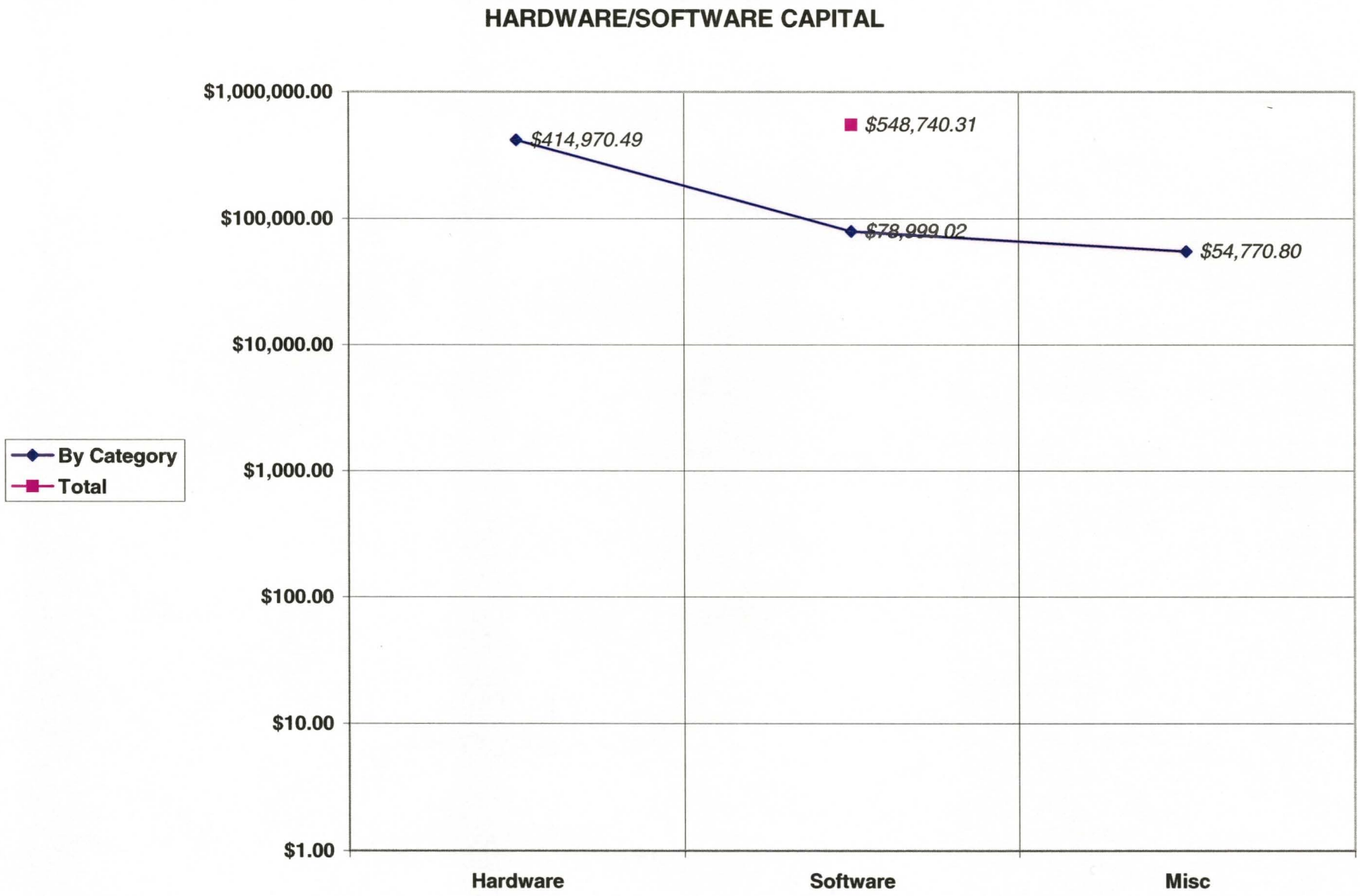
Evaluation Method: There will be several evaluations. One will be completed in Spring 2000 when the LAN Technical Services' rates will be calculated. This may be too soon to notice any significant results. However, some "best practice" recommendations have already been made; i.e., we have a standard hardware and software product set; there is an early software product that permits automated software distribution on a limited basis; software images have been developed for creating standard workstation configurations; etc.

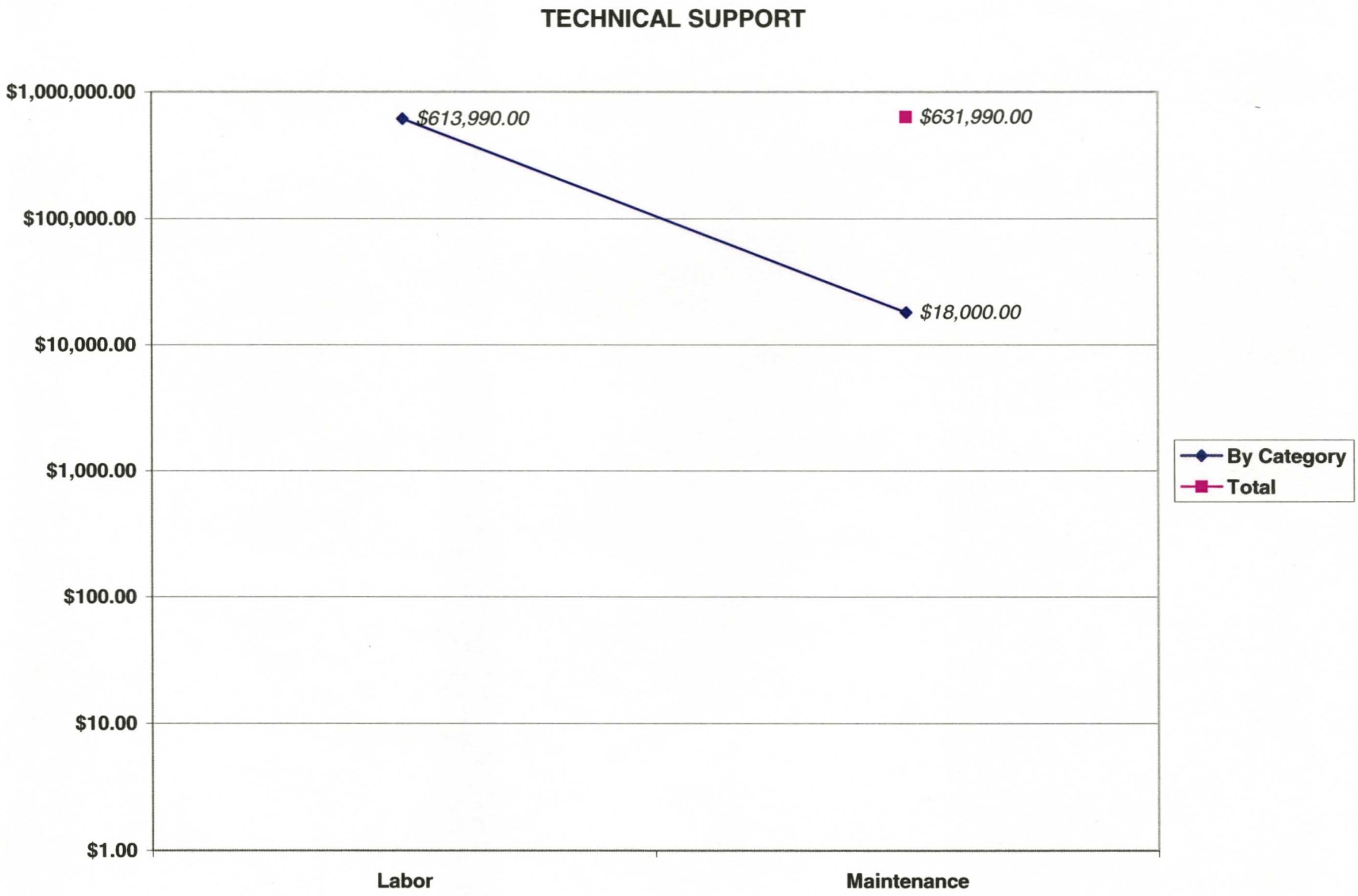
Each Quarter, OIR's total cost of ownership will be calculated and included in the Quarterly Report. An evaluation of the project status will be included at that time.

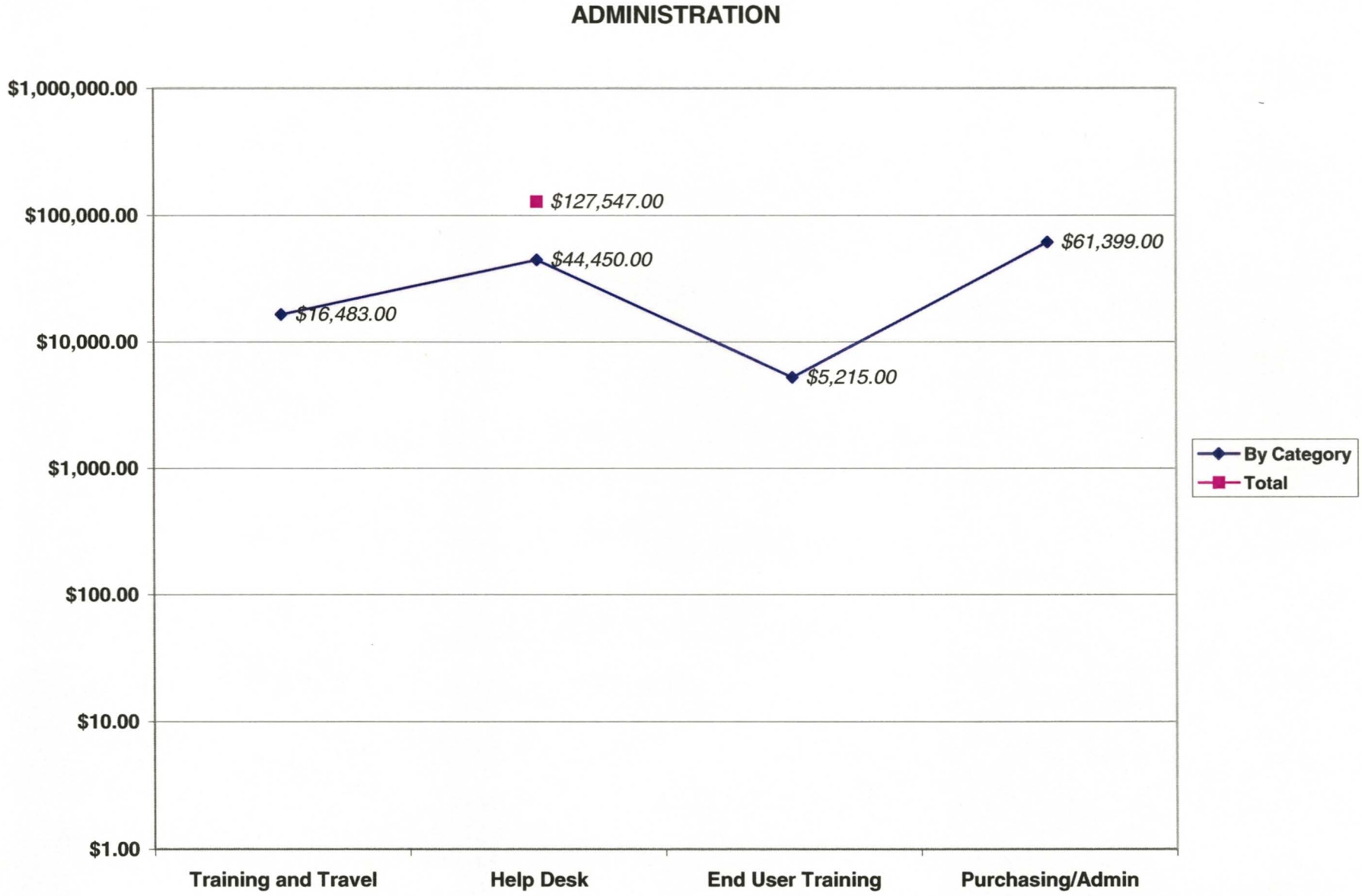
The final evaluation will be completed in Spring 2001. The LAN Technical Services' rates will again be calculated. Any cost reductions will be reflected in the rates.

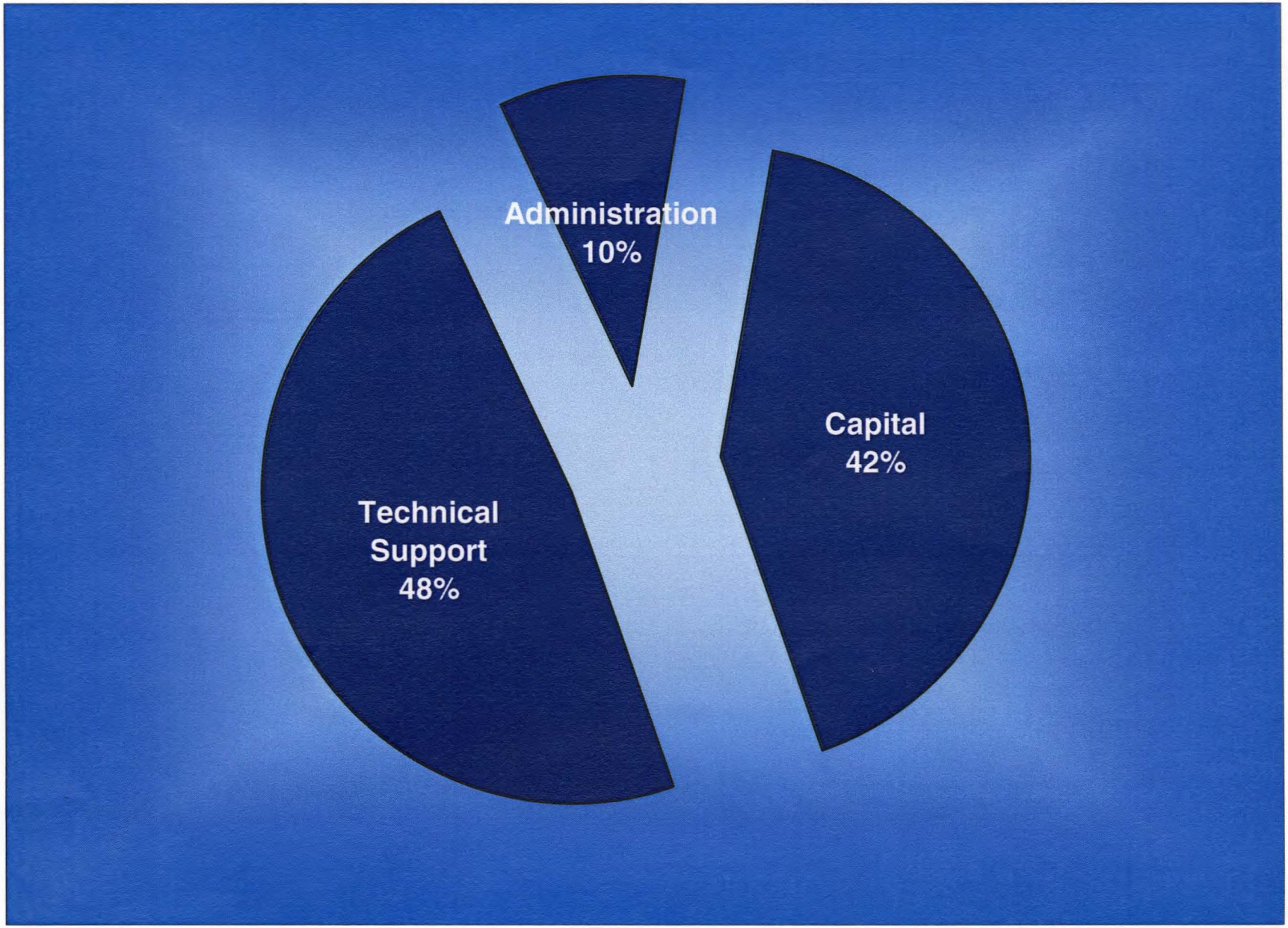
OIR TOTAL COST OF OWNERSHIP



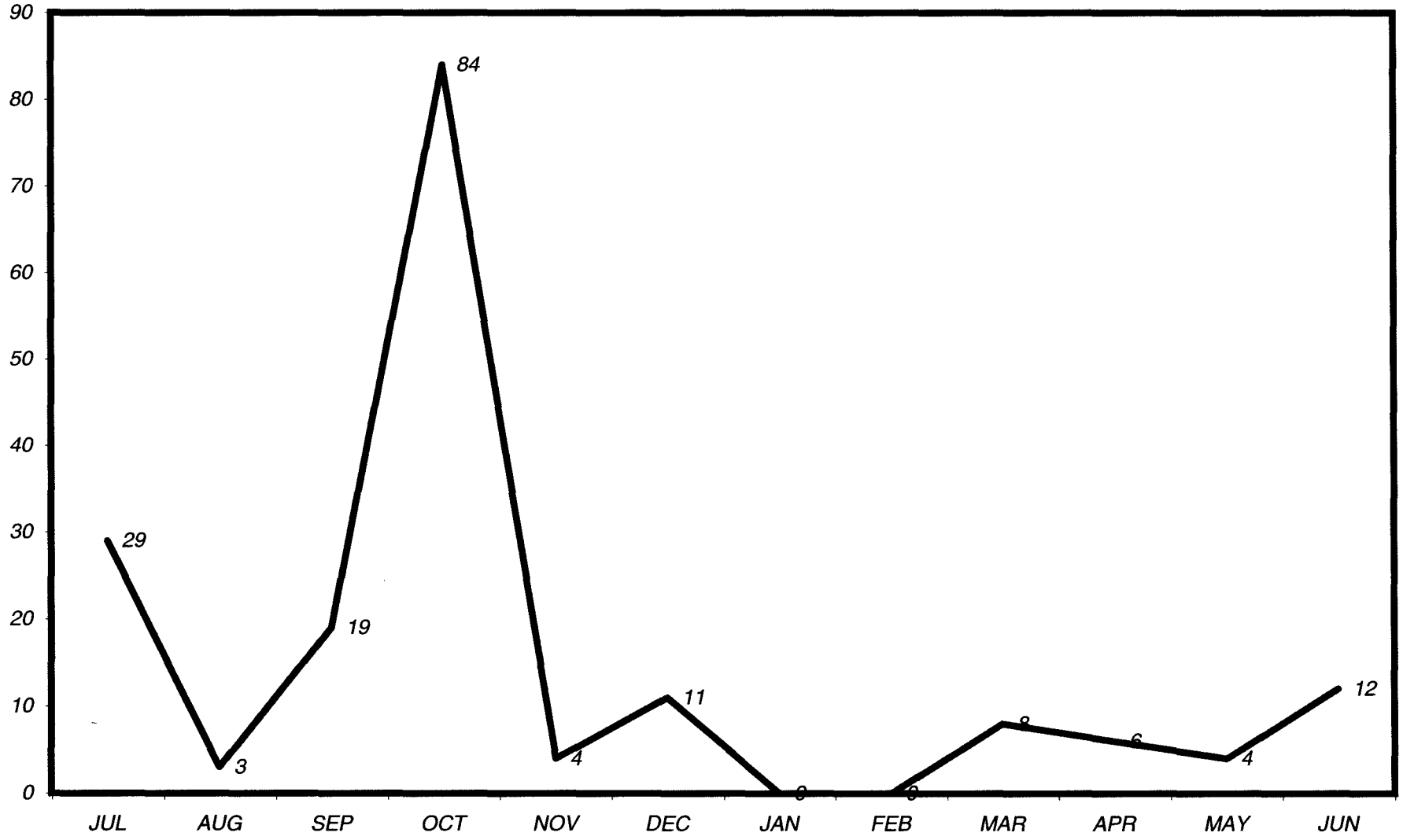








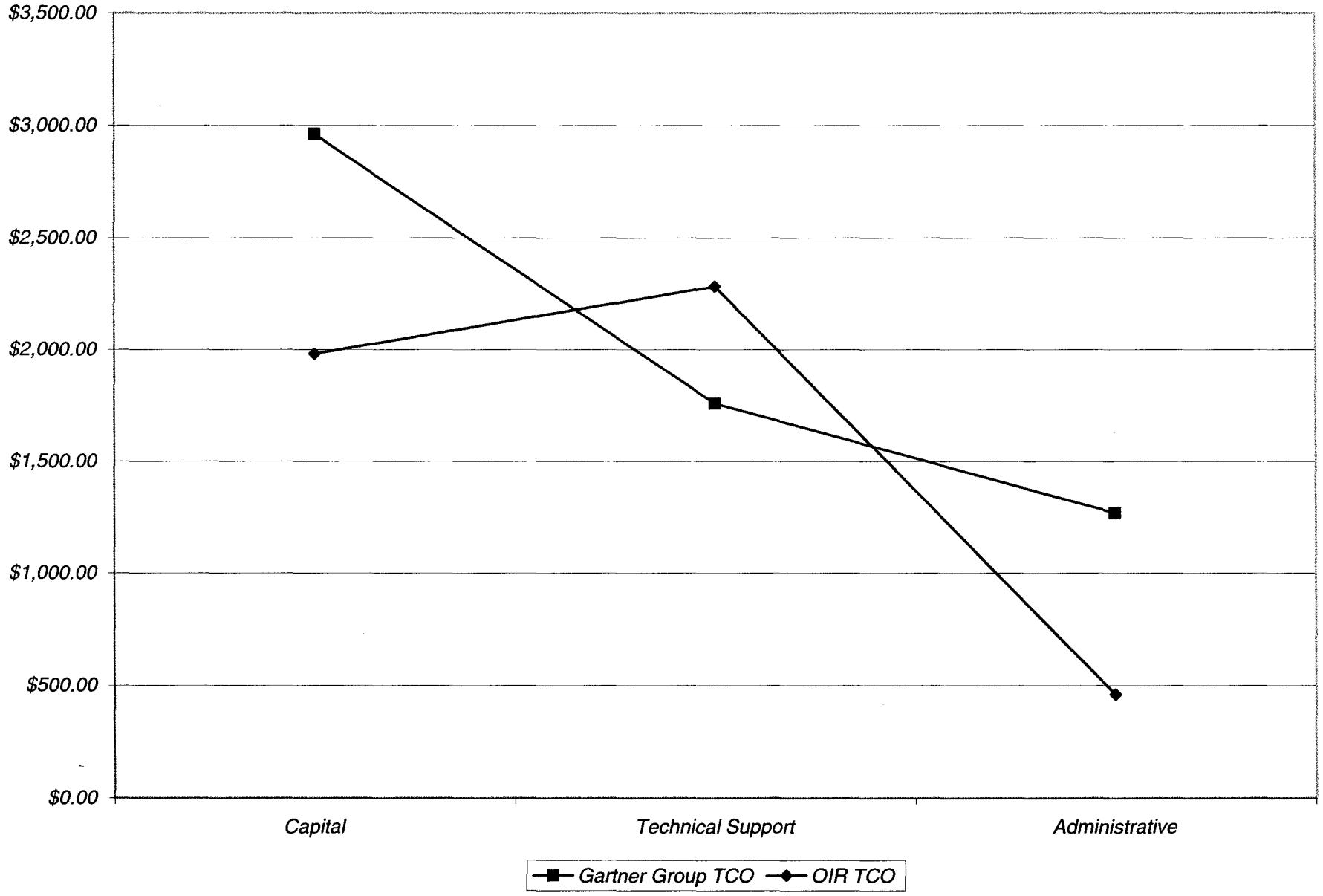
FY 1998/1999 NUMBER PC'S PROCURED BY MONTH



Month	User	PC Procured	Total
July -	Southern Legislative Conference	22	
	Southern Legislative Conference	7	
			29
August -	OIR-Nwmnmt - IT Manager	1	
	OIR-NW/NS - Gordon, Jeane	1	
	OIR-Telco - Jordan, Buddy	1	
			3
September -	OIR-ISO/Appl - MacDougal, Jim	2	
	OIR-Telco/ChsOps - Henage, Russ	1	
	LtGov - Jones, Lori	1	
	OIR-ISO/Appl - Brown, Bob	1	
	OIR-ISO/Appl - Ragin, Pat	1	
	OIR-NW/NS - Boison, David	1	
	OIR-ISO/AS - Oswald, Stephanie	1	
	OIR-ISO/Appl - Boyne, Bill	1	
	OIR-ISO/Tech Support - Weathersbee, Hayden (La	1	
	OIR-Telco/ColaOps - Wilson, Kathy (Laptop)	1	
	OIR-Telco/ColaOps - Jones, David (Laptop)	1	
	OIR-Telco/ColaOps - Paxton, Candace (Laptop)	1	
	OIR-Telco/ColaOps - Joyner, Debbie (Laptop)	1	
	OED-Tuition Assistance - Vacancy	1	
	OED-Tuition Assistance - Crenshaw, Cindy	1	
	OIR-ISO/Comp Room - Riley, Jim	1	
	OIR-NW/Support Services - Bouknight, Dwight	1	
	OIR-NW/Support Services - Butler, Henry	1	
			19
October -	OIR-ISO/Tech Support/Taylor, Eddie (Laptop)	1	
	OED/Hertz, Chantell (Laptop)	1	
	OIR-ISO/Special Projects/Fletcher, Barbara	1	
	OIR-ISO/Appl/Dunn, Debbie	1	
	OIR-ISO/Comp Room/Mixon, Danny	1	
	OIR-ISO/Tech Support/DSS/Bono, Michael	1	
	OIR-ISO/Tech Support/DSS/Thomas, Dietra, Thon	1	
	OIR-ISO/Tech Support/DSS/Wallace, Sidney	1	
	OIR-ISO/Tech Support/DSS/Dreyer, John	1	
	OIR-Telco/ColaOps/Cupps, Georgia	1	
	OIR-ISO/Appl	30	
	OIR-ISO/AS	15	
	OIR-ISO/CompRoom	1	
	OIR-ISO/IOControl	1	
	OIR-ISO	1	
	OIR-ISO/Tech Support	7	
	OIR-NW/NS	7	
	OIR-NW/PL	4	
	OIR-NW/Support Services	8	
			84

JUNE 1998 - JUNE 1999 PC'S PROCURED MONTHLY ATTACHMENT C

Month	User	PC Procured	Total
November -	OIR-NW/Council Support/Lausch, Kevin	1	
	OIR-NW/Council Support/Lausch, Kevin (Laptop)	1	
	OIR-NW/Council Support/Kinlaw, Del (Laptop)	1	
	OIR-ISO/Tech Support/House, Van	1	
			4
December-	OIR-NW/PL/Wrigley, Rick (Laptop)	1	
	Gov - Transition Team	10	
			11
January -			
			0
February -			
			0
March -	OIR-NW/NS/Fletcher, Tom (Laptop)	1	
	OIR-Telco/ChsOps/Carroll, Todd (Laptop)	1	
	OIR-Telco/ChsOps/Snyder, Billie (Laptop)	1	
	OIR-Telco/ChsOps/Lucent Tech (Laptop)	1	
	OIR-ISO/AS/McClary, Fran	1	
	OIR-ISO/AS/Boyd, Bobby	1	
	OIR-ISO/AS/Boleyn, Billy	1	
	OIR-ISO/Appl/Vacncy (Betty Pearce)	1	
			8
April -	Gov/Dean, Kim (Receptionist) (Laptop)	1	
	Gov/LeFever, Mike (Laptop)	1	
	Gov/Sacino Bruce (Laptop)	1	
	OIR-NW/Council Support (Laptop)	1	
	OIR-ISO/Parsons, Regis	1	
	OIR-ISO/Appl/Boone, Melinda	1	
			6
May -	Gov/Moodey, Lah	1	
	Gov/Owings, Cortney	1	
	Gov Task Force	1	
	Gov Task Force	1	
			4
June -	OIR-ISO/AS/McSwain, Todd (Laptop)	1	
	OIR-NW/Support Services (PC's for Disaster)	6	
	OIR-NW/Support Services (Laptop for Disaster)	1	
	OIR-Telco/ColaOps/Beeker, Earl	1	
	OIR-Telco/ColaOps/Ragen, Jimmy	1	
	OIR-ISO/Tech Support/West, Greg	1	
	OIR-Telco/ColaOps/Jones, David	1	
			12



ATTACHMENT E

BEST PRACTICES IMPLEMENTATION PLAN

Description	Assigned To	Date Due
Define hardware and software standards	Debbie Dunn	02/15/00
Define workstation configuration standards	Jill Hallidy	03/15/00
Automate Asset Management function	Debbie Dunn	09/01/00
Automate software distribution	Tom Crews	07/01/00
Automate Virus Detection and Repair	Susan Britt	04/01/00
Implement Unattended Power Up	Todd McSwain	12/30/00
Install Client Remote Control	Todd McSwain/ Larry Page	10/01/00
Review Methods for User State Management	Jill Hallidy	07/01/00
Lock the User Environment	Jill Hallidy	07/01/00
Review user training requirements	Ruth Kirkland	06/30/00
Develop LAN training plan	Ruth Kirkland	06/30/00
Investigate systems management tools	Tom Crews	09/30/00
Review change coordination between groups	Ruth Kirkland	04/30/00
Identify methods for capacity planning	Tom Crews	08/30/00